

REMARKS

I. Status of the Application

Claims 1-7, 9-11 and 13-26 are pending in this application. In the September 12, 2005 office action, the Examiner:

A. Rejected claims 1-5, 9-11, 13-15 and 17 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent Application No. 2004/0253809 to Yao et al. (hereinafter “Yao”);

B. Rejected claims 6 and 7 under 35 U.S.C. § 103(a) as allegedly being obvious over Yao.

C. Allowed claim 26;

D. Objected to claims 16, and 18-25 as being dependent upon a rejected base claim, but would be allowable if re-written in independent form, including all of the limitations of the base claim and any intervening claims.

The allowance of claim 26 is gratefully acknowledged. In this response, claim 9 has been amended to depend from claim 1 instead of claim 8. New claim 27 has been added. New claim 27 is based on pending claim 1 and includes allowable subject matter from objected-to claim 16. Applicant traverses rejections of claims 1-7, 9-11, 13-15 and 17, and respectfully submits that the claims are now in a condition for allowance. Entry of this amendment and allowance of the application is earnestly solicited.

II. Prior Art Rejections Should Be Withdrawn

In the May 3, 2005 office action, the Examiner rejected 1-7, 9-11, 13-15 and 17 as allegedly being anticipated by or being obvious over Yao. For the reasons discussed below, Yao does not teach, show or suggest all the limitations of claims 1-7, 9-11, 13-15 or 17.

A. Claim 1

Claim 1 stands rejected as anticipated by Yao. Yao does not teach the limitations all of the limitations of claim 1 and therefore does not anticipate claim 1. In particular, the Examiner alleges that Figs. 1A-1B together with paragraphs 20, 25 and 27-29 of Yao disclose the features as defined in claim 1. However, Yao fails to teach selectively removing the contact structure with at least one of the layers of the multiple-layer structure of the seed layer acting as a stop layer in the selective removal.

Yao teaches providing a dielectric layer over a substrate. (See Yao, paragraph [0020]). The dielectric layer is patterned with recessed and non-recessed areas. (*Id.*) A barrier/seed layer 105 comprising a barrier layer and/or a seed layer is formed over the dielectric layer. (*Id.*) A metal layer 106 is then formed over the barrier/seed layer 105. (*Id.*) The metal layer 106 is removed over the non-recessed areas by a planarization process followed by an electropolishing process. (See Yao, paragraph [0021]).

The Examiner points to FIG. 1B of Yao as providing the teaching that the seed layer acts as a stop layer for the selective removal. Referring to FIG. 1A of Yao, there is shown the substrate 102 having a seed layer 105 and a metal layer 106. FIG. 1B shows the same structure after an electropolishing process has been performed. The raised area 110 has not been removed down to the seed layer 105, nor has the metal layer 106 that is shown in the recess 114. This

indicates that something besides the seed layer 105 was used to stop the electropolishing procedure. There is no indication in FIG. 1B that the seed layer 105 has acts as a stop layer in the selective removal of the contact structure.

Moreover, Yao teaches away from using the seed layer as a stop layer during the selective removal step. Yao discloses that the metal layer 106 and the barrier/seed layer 105 are removed over the non-recessed areas of the dielectric layer by a planarization process followed by an electropolishing process. (See Yao, paragraphs [0039]-[0041]). Specifically, Yao states “If layer 105 is, or includes, a seed layer, the electropolishing process that polishes metal layer 106 may remove it . . .”. (Yao, paragraph [0041]). Thus, Yao discloses selectively removing the contact structure as well as the seed layer over the non-recessed areas. This is contrary to the teachings claim 1 of the present invention, wherein a layer of the seed layer is used as a stop layer during the selective removal and, therefore, is not removed during the selective removal step.

Accordingly, because Yao does not teach, show or suggest the limitation of selectively removing the contact structure with at least one of the layers of the multiple-layer structure of the seed layer acting as a stop layer in the selective removal, it is respectfully submitted that the rejection of claim 1 should be withdrawn.

B. Claims 2-7, 9-11, 13-15 and 17

Claims 2-7, 9-11, 13-15 and 17 all stand rejected as allegedly being anticipated or rendered obvious by Yao. Claims 2-7, 9-11, 13-15 and 17 depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claims 2-10 should be withdrawn as well.

C. Claims 16 and 18-25

Claims 16 and 18-25 all stand rejected as objected to because the claims are dependent upon a rejected base claim, but would be allowable if re-written in independent form, including all of the limitations of the base claim and any intervening claims. Claims 16 and 18-25 depend from and incorporate all of the limitations of claim 1. Since claim 1 is believed to be allowable, it is respectfully submitted that the objection to claims 16 and 18-25 should be withdrawn.

D. New Claim 27 is Allowable Since It Is Based on Allowable Claims

Applicants have introduced a new independent claim 27 based on claims 1 and 16. Because claim 16 was already considered allowable if written as an independent claim, the inclusion of the allowable subject matter of claim 16 into new claim 27 should make new claim 27 allowable.

III. Conclusion

For all of the foregoing reasons, it is respectfully submitted the applicants have made a patentable contribution to the art. Favorable reconsideration and allowance of this application is, therefore, respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'H. Moore', with a long horizontal flourish extending to the right.

Harold C. Moore
Attorney for Applicants
Attorney Registration No. 37,892
Maginot Moore & Beck
Bank One Center Tower
111 Monument Circle, Suite 3000
Indianapolis, Indiana 46204-5115
Telephone: (317) 638-2922